OXCart Black
FILE Shield Meetings

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[redacted] 25X1

OXC-8713-65
Cy 4 of 11

ILLEGIB

2 June 1965

COMMENTS ON ENGINE RELATED AREAS OF BLACK SHIELD

25X1 MEETING AT [redacted], 12 AND 13 MAY 1965

[redacted]

Printed flight test

1. The three flight test validation items specifically engine related were:

a. Engine durability validation.

b. Engine relight/TEB capacity increase evaluation.

c. Single engine (actually an aircraft performance item but engine related).

25X1 2. Questions arose involving the proper interpretation of [redacted] which outlined P&W's proposed flight test program for engine reliability validation, the major question being whether a requirement for 12 consecutively successful flights with no engine problems represents the actual goal needed to establish a proper level of engine reliability for BLACK SHIELD. This situation has been resolved as follows:

25X1 P&W [redacted] will elaborate on their suggested engine durability testing program at the next scheduled BLACK SHIELD meeting. It should be noted, however, that the requirement for the proposed 12 consecutive missions is qualified by the last paragraph of [redacted] which states that "should an engine malfunction occur on any of the 12 missions, it will be investigated and further recommendations made regarding additional flight testing and/or corrective changes if required." 25X

3. The flight test program proposed by LAC for establishing a relight high confidence envelope with the TEB system utilizing the half size shot (25 cc) involves relight attempts at the following conditions:

Mach Number	KEAS
1.6	350, 375, 400
2.2	300, 350, 375, 400

[redacted] 25X1

SECRET

Info Act Init.

✓		CHIEF
		IE
✓		OXCART
		[illegible]ALIST
		SUPPLY

GROUP 1 Excluded from automatic downgrading and declassification

Logged 6/3/65

25X1

2.8	300, 350, 375, 400
3+	" " " "

These tests will be conducted on aircraft number 122 which already has an engine installed with the short shot TEB system and on number 129 which will have this system installed shortly. At least six test flights are planned during period 24 May to 2 July. The basic idea here involves establishing the relight envelope with the 25 cc shot TEB system to ascertain the validity of increasing the quoted number of TEB shots for the current system at 16 since the current (unmodified) TEB system is capable of 12 shots at 50 cc/shot and at least four additional shots of 25 cc capacity or greater.

25X1 [redacted] indicated a need for obtaining the following information from the proposed relight tests. The appropriate paragraph of this message is quoted here verbatim. "It has therefore been suggested to C&J flight test personnel that they determine by actual flight test and in particular after prolonged windmilling operation at low air speeds and high altitude to obtain cold soak of the engine, just how many times the present CIT unit will light the engine. The same tests should also be conducted for A/B lights since the conditions of lighting do not necessarily require the same energy as lighting the main burner. Therefore, the A/B may be relit more times for a full charge than the main engine. Such tests should include a number of engines and pilots to obtain representative data and permit determination of a satisfactory relight capability insofar as number of TEB shots is concerned." It will be ascertained whether or not P&W still desires that these tests be conducted, since they require more extensive flight testing than the tests mentioned above to establish a relight envelope with the reduced size TEB shot and would also involve the complete depletion of the TEB supply on one engine.

4. The proposed LAC flight test program for establishing aircraft single engine performance was presented as follows:

> Single engine tests will be made at descent and subsonic cruise.
>
> Descents will be made at the following conditions:
>
> > 350 KEAS constant military RPM, minimum and maximum afterburning.

300 KEAS constant military RPM minimum afterburning to 3.2 Mach then level decel to 350 or 300 KEAS.

Subsonic cruise tests will be made at the following conditions:

Minimum afterburning at .8 Mn, .75 Mn, .70 Mn

Military power at .75 Mn, .70 Mn, and .65 Mn.

Starting gross weights for descent will be about 90,000 lbs.

About four test flights on article 129 are planned to investigate single engine performance during the period 24 May to 18 June.

5. An additional topic concerned the test experience to date with the [redacted] controls. It is [redacted] opinion that the [redacted] control generally requires more trimming than the [redacted] From flight test data on A/C 122 it appears that with the recent improvements in the [redacted] (i.e., the "Frosty Control") that there are no significant differences in the ability of the [redacted] controls to follow the proper EGT vs. T_{T_2} schedule. An effort will be made to thoroughly investigate recent flight data and inflight trimming experience obtained with the latest control improvements in an attempt to clear the air as much as possible on the overall fuel control situation. P&W [redacted] feels very strongly that with the recent improvements to both the [redacted] and [redacted] controls if the pilot had a more clear indication of where he should trim the control as a function of Compressor inlet temperature (CIT or T_{T_2}), especially on the steep positive slope portion of the CIT vs. EGT schedule below $0^{o}C$, CIT, most of the fuel control and trimming problems would be solved. [redacted] strongly advocates adaption of the recent proposal to locate proper EGT values around the cockpit CIT gage as an interim aid to the pilot until the error gage becomes available. A pocket sized card with EGT vs. CIT table may be another interim solution since more values of EGT and CIT could be listed at CIT readings below $0^{o}C$.

In any case, however, most of the cockpit CIT gages do not read CIT values below $0^{o}C$, so the pilot has positively no indication of what his EGT should read even if he had EGT

indications on the CIT gage or a substitute pocket card for this purpose. This deficiency in the CIT gage makes proper trimming at such flight conditions as at tanker hook-up impossible. According to [redacted] the CIT gage which reads below 0°C may be a part of the mod program but he could not ascertain that it was and this matter will be clarified in the very near future. 25X

The data presented by P&W [redacted] at the May 13 Area meeting regarding flight test experience with various improved fuel controls was rather confused and inconclusive mainly due to the fact that all improved [redacted] controls do not have all of the latest improvements which include primarily the so called stability fixes, tilted schedule, and "frosty" or insulation fix. An effort will also be made to maintain and keep better records of flight experience with various types of modified controls to improve on this area of confusion. 25X 25X

[redacted] 25X
ASD/OSA

25X1 ASD/OSA/[redacted] (2 June 1965)
Distribution:
Cy 1 - D/FA/OSA
2 - OXC/OSA
3 - AD/OSA
4 - MD/OSA
5 - PS/OSA
6 - ASD/OSA
25X1 7 - ASD/OSA [redacted]
8 - ASD/OSA
9 - D/TECH/OSA
10 - chrono
11 - RB/OSA

[redacted] 25X
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